



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/328,911	06/09/1999	WALTER GELON	PA-98038	7456

41339 7590 11/12/2004

KARAMBELAS & ASSOCIATES
655 DEEP VALLEY DRIVE, SUITE 303
ROLLING HILLS ESTATES, CA 90274

EXAMINER

BROADHEAD, BRIAN J

ART UNIT	PAPER NUMBER
----------	--------------

3661

DATE MAILED: 11/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/328,911

Applicant(s)

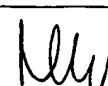
GELON ET AL.

Examiner

Brian J. Broadhead

Art Unit

3661



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 1 recites the limitation "the intermediate orbits" in line 7 and 8. There is insufficient antecedent basis for this limitation in the claim. Earlier in the claim "intermediate orbits" are disclosed making it unclear which one is being referred to.

4. Claim 23 recites the limitation " the intermediate orbits " in lines 8 and 9. There is insufficient antecedent basis for this limitation in the claim.

5. The remaining rejected claims are all dependant on claim 1 or 23.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 6-8, 10-18, 20-25, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porte, p., "Benefits of Electrical Propulsion for Orbit Injection of Communication Spacecraft", in view of Tilley et al., 6186446.

3. As per claims 1, 6, 7, 8, 10, 11, 14, 15, 17, 18, 20, 21, 22, 23, 24, 25, 27, and 28, Porte discloses launching a spacecraft with chemical and electrical propulsion and a solar array on page 6, section 3.4.3; firing the chemical propulsion at the apogees of the intermediate orbits, starting from the transfer orbit initiated by the launch vehicle, to successively raise perigees of the orbit until the spacecraft perigee substantially clears the Van Allen radiation belts, and where the semi-major axis of the intermediate orbit is substantially less than the semi-major axis of a final orbit, and where the inclination of the intermediate orbit is substantially greater than the inclination of the final orbit on page 2 section 3.1, strategy 3; firing the electric thrusters to raise the orbit of the spacecraft from the orbit achieved by the chemical thrusters firing step to near geosynchronous orbit by steering the thrust vector both in plane and out of plane while rotating the spacecraft body and steering the solar array to maintain the solar while rotating the spacecraft body and steering the solar array to maintain the sun's illumination on the solar array while not maintaining an earth facing panel on page 2 section 3.1, strategy 3; and selectively firing the chemical thruster to achieve geosynchronous orbit on page 2, columns 1-2; pointing the thrust away from the center of mass is inherent.

4. Porte does not disclose not maintaining the solar array rotation axis aligned with the orbit normal; the thruster firing profile is generated, and the spacecraft can be controlled on-board or from the ground; the step of firing the electric thruster is revised to compensate for disturbances; using momentum wheels; thrusters are differentially fired away from the center of mass for control torque and using thruster on the north

and south side of the spacecraft to decrease the duration of the orbit raising phase.

Tilley et al. teach of not maintaining the solar array rotation axis aligned with the orbit normal on lines 20-35, on column 3; the thruster firing profile is generated, and the spacecraft can be controlled on-board or from the ground on line 65, on column 2, through line 5, on column 3; and the step of firing the electric thruster is revised to compensate for disturbances on lines 2-5, on column 3; using momentum wheels on lines 55-57, on column 3; thrusters are differentially fired away from the center of mass for control torque and using thruster on the north and south side of the spacecraft to decrease the duration of the orbit raising phase on lines 1-3, on column 3; and a throttle back mode on lines 28-29, on column 3.

5. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings of Tilley et al. in the invention of Porte et al. because such modification would optimize thrust efficiency as disclosed in the background of Tilley et al.

6. As per claim 2, Porte discloses the thrust vector is maintained substantially normal to the axis of the solar array and the sun is normal to the solar array on page 2, column 2, paragraph 3 in section 3.2.

7. As per claim 4, Porte discloses that the transfer orbit is subsynchronous on page 2 section 3.1, strategy 3.

8. As per claims 12 and 13, Porte discloses a hybrid propulsion system to use both chemical and electric propulsion to achieve a final geosynchronous orbit in figure 1, strategy 3, and in section 3.4.3.

9. As per claims 16, Porte discloses firing the electric propulsion thrusters to raise the orbit of the spacecraft comprises pre-planned electric thruster coast periods that are selectively shortened or lengthened in duration to compensate for disturbances on page 2, column 2. The apogee thrusting is done after a coasting period.

10. Claims 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porte, p., "Benefits of Electrical Propulsion for Orbit Injection of Communication Spacecraft", in view of Tilley et al., 6186446 as applied to claims 1, 18, and 23 above, and further in view of Hosick et al., 6032904.

11. Porte and Tilley disclose all the limitations as set forth above. Porte and Tilley do not disclose using gimbals to point the thrust or differential thrust away from the center of mass to provide control torque. Hosick et al. teach using gimbals to point the thrust or differential thrust away from the center of mass to provide control torque lines 49-51, on column 7. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use these teachings of Hosick et al. in the invention of Porte and Tilley because they are the conventional ways to control spacecraft. Gimballed thrusters are known as a way to reduce the necessary number of thrusters needed and to get the most thrust with the least amount of fuel because differential thrust can be reduced.

12. Claim 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porte, p., "Benefits of Electrical Propulsion for Orbit Injection of Communication Spacecraft", in view of Tilley et al., 6186446 as applied to claim 1 above, and further in view of Spitzer et al., 5595360.

Art Unit: 3661

13. Porte and Tilley disclose the limitations set forth above. Porte and Tilley do not disclose the transfer orbit is supersynchronous. Spitzer et al. teach of using a transfer orbit that is supersynchronous on lines 65-67, on column 6. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a supersynchronous orbit because such modification would provide longer burn time for raising perigee and decreasing inclination as stated on lines 1-5, on column 7 of Spitzer et al.

Allowable Subject Matter

14. Claims 3, 9, 26, and 29 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose steering the thrust vector so that thrust vector is not normal to the axis of the solar array.

Response to Arguments

16. Applicant's arguments with respect to claims 1 through 29 have been considered but are moot in view of the new ground(s) of rejection. With respect to the argument made for claim 1, Porte et al. does not disclose keeping an earth facing panel. Porte does mention an earth facing panel once operational, but this would be after the orbit raising.

Conclusion

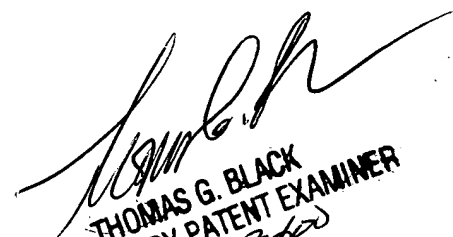
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Broadhead whose telephone number is 703-308-9033. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on 703-305-8233. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.



BJB
October 21, 2004



THOMAS G. BLACK
SUPERVISORY PATENT EXAMINER
GROUP 3661